

# PATENT SPECIFICATION

1,027,370

DRAWINGS ATTACHED.

1,027,370



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## COMPLETE SPECIFICATION.

### Improvements in or relating to Powder-Fed Flame Spraying Torches.

We, EUTECTIC WELDING ALLOYS CORPORATION, a corporation organized and existing under the laws of the State of New York, United States of America of 40—40 172nd Street, Flushing 59, State of New York, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a flame spray torch having a powder injecting section, and it more particularly relates to such a section for a combination powder feeding and storage container.

Various torches have been proposed for injection powders into the stream of burning gas emitted from a torch for coating and fusing them upon a surface. These torches feed the powders into the stream of gas from a powder container mounted upon the torch. These containers usually include an orifice disposed above the level of the powder for allowing air to flow into them as powder flows out to prevent a negative pressure from being formed in the container and interfering with the dependable free flow of powder from it. It is convenient to also use such containers for storage when all powder is not dispensed by removing them from the torch and storing them in a position inverted from that in which they are torch-mounted. This requires sealing the orifice by removable means such as a plug or tape. However these removable seals are inconvenient and easy to lose which causes considerable powder spillage.

An object of this invention is to provide a simple, economical and dependable means for allowing air to flow into a powder dispensing container without puncturing its body.

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In accordance with this invention an air passage extends through the engaged portions of a coupling means such as a bayonet type coupling or screw threads which connect the neck of a powder dispensing container to the powder injecting section of a flame spraying torch. Even though this passage is disposed below the level of the powder in the container, in some way not completely understood, air enters through it and finds its way above the level of the powder to prevent negative pressure from being formed in the container and interfering with the free flow of powder from it. This passage may be merely a loose fit within the coupling or an actual slot may be formed either in the outside wall of the neck of the container or within the inside wall or base of a connector cup within which it is inserted. When it is formed in the cup, the neck may have a peripherally complete coupling formed on its outer surface such as a screw thread or resilient locking protuberances. When the slots are formed in the outside of the necks of the containers, the part of the coupling within the cup may be circumferentially complete. When the slot is in the outside wall of the neck, the end of the neck communicating with the slot is notched to facilitate the flow of air even if the end should seat within a connector cup. Puncturable diaphragms may be provided within powder feeding and air conducting holes within plugs mounted in the necks of containers having slots in their outer walls to positively seal them prior to use. In conjunction with a bayonet type coupling a concentric ring upon the neck engages the outer edge of the cup to firmly support the container, and a slot extends through the ring to permit air to pass through it.

The invention will now be described in greater detail by way of example with refer-

ence to the accompanying drawings wherein similar reference characters refer to similar parts and in which:

5 Figure 1 is a side-elevational view partly broken away in cross section of one embodiment of this invention mounted upon a flame spraying torch shown in phantom outline;

Figure 2 is a side view in elevation of another embodiment of this invention;

10 Figure 3 is a cross-sectional view taken through Figure 2 along the line 3—3;

Figure 4 is an end view of the embodiment shown in Figure 2;

15 Figure 5 is a cross-sectional view of a cup for use in conjunction with the embodiment shown in Figures 2 to 4;

Figure 6 is a side-elevational view of another embodiment of this invention;

20 Figure 7 is an end-elevational view of the embodiment shown in Figure 6;

Figure 8 is a cross-sectional view taken through Figure 6 along line 8—8;

25 Figure 9 is a cross-sectional view taken through a cap for use in conjunction for the embodiment shown in Figure 8;

Figure 10 is a view in elevation of a further embodiment of this invention;

30 Figure 11 is an end view of the embodiment shown in Figure 10;

Figure 12 is a cross-sectional view taken through Figure 10 along the line 12—12;

35 Figure 13 is a cross-sectional view of a cap for use in conjunction with the embodiment shown in Figure 12;

40 Figure 14 is a view in elevation partially broken away in cross section of the embodiment shown in Figures 10 to 12 engaged with a connector cup for mounting upon the powder injecting section of a flame spraying torch;

Figures 15 and 16 are respectively cross-sectional and elevational views of the cup shown in Figure 14;

45 Figure 17 is a plan view of the cup shown in Figure 1;

Figure 18 is a view in elevation of the cup shown in Figure 17;

Figure 19 is a cross-sectional view taken through Figure 17 along the line 19—19;

50 Figure 20 is a plan view of another form of the cup shown in Figure 1;

Figure 21 is a view in elevation of the cup shown in Figure 20;

55 Figure 22 is a cross-sectional view taken through Figure 20 along the line 22—22;

Figure 23 is a cross-sectional view in elevation of still a further embodiment of this invention;

60 Figures 24 and 25 are respectively elevational and bottom-plan views of the container portion of the embodiment of Figure 23;

Figure 26 is a top-plan view of the cup portion of the embodiment of Figure 23;

65 Figure 27 is a cross-sectional view taken through Figure 26 along the line 27—27; and

Figures 28 and 29 are respectively elevational and bottom-plan views of a capped plug for sealing the container of Figures 24 and 25.

70 In Figure 1 is shown a powder-fed flame spraying torch 10 including a powder injecting section 12. A longitudinal gas conducting passageway 14 extends through the section 12, and a powder supplying channel 16 extends from within a connector in the form of a cup 18 upon the powder injection section 12 to its intersection with the longitudinal gas conducting passageway 14. A container 20 is mounted upon the connector cup 18 with its neck 22 engaged by coupling means 24 within the connector 18. The coupling means 24 is mutually engaging screw threads.

85 A slot 26 extends through the coupling means 24 for permitting atmospheric air to pass from outside the coupling means 24 through it and into the container 20 wherein it replaces dispensed powder 28 to facilitate its flow therefrom. The slot 26 is formed within the connector 18 shown in detail in Figures 17 to 19 in the form of a longitudinal end-milled hole 26 passing through internal threads 30 of the connector 18. This permits circumferentially coupled screw threads 32 to be formed upon the neck 22 of the container 20. For reasons that are not completely understood, air can readily flow through the end-milled hole 26 which is shown in Figure 19 to extend past a shoulder 34, which defines the lower limit of travel for the end of the neck 22, into the air above the level of powder 28 in the container 20 without allowing the powder to spill up and out of the hole 26.

105 In Figures 2 to 4 is shown another form of this invention in which a slot 26A is formed in the neck 22A of a container 20A. The slot 26A is disposed in the outer end of the neck 22A (which includes screw threads 32A) in communication with a notch 36A for facilitating the flow of air into the container 20A even if the bottom end 38A of the container 20A were seated upon a surface within the connector cup 18. The container 20A as well as the other containers shown herein are conveniently made of a resilient plastics material such as polyethylene.

110 A convenient cap 40A for sealing the open neck of the container 20A when it is detached from the connector cup 18 is shown in Figure 5. It includes an internal tapered plug 42A for insertion within the inside surface 44A of the neck 22A for sealing powder 28A within the container when it is removed from the torch 10. The plug 42A seals the container even though its end includes a notch 36A.

120 In Figures 6 to 9 is shown a container 20B holding powder 28B which is similar to the container 20A with the exception that 130

the means for coupling it to within the connector cup 18 is comprised of a tapered resilient circumferential protuberance 46B which engages within a corresponding annular recess (not shown) in a coupling 18B (also not shown) similar to the recess 48B in the cap 40B. The container 20B accordingly is coupled to the connector cup 18 by a resilient snap-fit instead of screw threads 32. The neck of container 20B also includes slot 26B and notch 36B.

In Figures 10 to 16 is shown another container 20C holding powder 28C which is an embodiment of this invention in which the neck 22C is engaged by a press fit within the connector cup 18C shown in Figures 14 to 16. An internal plug 50C is inserted in the neck 22C, and it includes a central powder feeding hole 52C and a side air-conducting hole 54C. The hole 54C communicates with a slot 26C on the outside of the neck 22C through a notch 56C in the edge of the internal plug 50C for conducting air through the slot 26C to an air-conducting hole 54C. Diaphragms 58C and 60C are respectively provided in the holes 52C and 54C for positively sealing powder within the container 20C prior to use. A cap 62C which engages about the outside of the neck 22C conveniently seals the container both prior to puncturing and after puncturing as described.

In Figure 14 the connector cup 18C is engaged with the neck 22C by forcing it in the direction (schematically shown in Figure 12) to cause tubes 64C and 66C, carried by the connector cup to respectively puncture the diaphragms 58C and 60C to permit powder and air to respectively flow through them as previously described. The hole 67C in the base of the tube 66C communicates with the notch 56C. The container 20C is therefore automatically punctured when it is engaged with the connector 18C, which in Figures 14 to 16 is shown removed from the torch for convenience of illustration.

Figures 20 to 22 show another form 18D of the connector cup shown in Figures 17 to 19 in which a funnel-shaped aperture 68D is provided within the lower portion of the connector cup 18D for smoothly guiding powder into the powder supplying channel 16 without any rectangular shoulders which might trap powder and interfere with its free flow. Connector 18D has internal threads 30D and slot 26D.

In Figure 23 is shown still a further embodiment of this invention in which a coupling 24E of the bayonet type connects a container 20E to a connector cup 18E as shown in Figures 24 to 27. The bayonet coupling 24E includes external bayonet lugs 84E on the neck 22E of the container 20E and internal bayonet lugs 76E within the connector cup 18E. The engaging surfaces of the external and internal bayonet lugs are

cooperatively tapered to engage them snugly with each other and the neck 22E of the container 20E within the connector cup 18E. The bayonet type coupling 24E is usually loose enough to permit air to pass through it to prevent an undue reduction in pressure within the container 20E as powder 28E is discharged through the passage 16E into the gas-conducting passage 14E as the torch 10E is operated. This is especially true when the container 20E is of the type having a movable wall which is illustrated in which the movable wall moves inwardly upon removal of contents to prevent an undue decrease of pressure therein. Such a container is described and claimed in copending British Patent application No. 50236/63 (1,027,369). However to avoid any restriction whatsoever upon the feeding of the last portions of powder 28E within the container 20E, a small slot 70E is provided in the base of the cup 18E to provide a very small controlled leakage of air into the container 20E. This leakage of air is so slight that it does not substantially alter the sealed character of the container 20E, but it facilitates the flow of the last portions of powder from it. The same might be accomplished by merely a loose fit, but the provision of the slot 70E makes it absolutely certain that an accidental complete seal might not restrict the last portions of powder flowing out of the container.

Fig. 27 shows the funnel shaped aperture 68E disposed below the top 78E of the cup 18E.

A ring 86E is concentrically disposed on the neck 22E of the container 20E a short distance from the external bayonet lugs 84E. The ring 86E engages the upper surface of the connector cup 18E to maintain the container 20E firmly and squarely engaged with it. A slot 88E is provided in the ring 86E for ensuring that air flows through it and thence through the coupling 24E.

The connector cup 18E is removably secured to the section 12E by screw threads 82E upon the lower end 80E of the connector cup 18E. A smooth funnel-shaped exit 68E is provided within the connector cup 18E for ensuring the smooth flow of powders into the powder supplying channel 16E.

The cap plug 40E shown in Figures 28 and 29 is provided for sealing the container 20E when it is removed from the torch. It includes a tapered plug 42E for insertion within the neck 22E, and it firmly and securely seals the container 20E from the atmosphere during storage and prevents loss of contents. The plug 40E and the substantially sealed nature of the container during discharge afforded by only the slight leakage of air through the loose coupling 24E maintains the contents of the container 20E substantially protected from atmospheric moisture and corrosion during storage and use.

## WHAT WE CLAIM IS:—

1. A flame spray torch having a powder injecting section comprising a longitudinal gas conducting passageway through said section, a connector upon said section, a powder supplying channel in said section extending from within said connector to said longitudinal gas-conducting passageway, a powder container engaged with said connector for supplying powder to said powder-supplying channel, coupling means engaging said container with said connector, and said coupling means incorporating an air passage extending through it for permitting atmospheric air to pass from outside of said coupling means through it and into said container whereby it replaces powder dispensed from said container to facilitate the flow therefrom.
2. A torch as claimed in claim 1, wherein the air passage comprises a slot extending through the coupling means.
3. A torch as claimed in claim 2 wherein the connector includes a cup upon the section, the container includes a neck inserted within said cup, and the coupling means engages outside of said neck within the inside of said cup.
4. A torch as claimed in claim 3, wherein the slot is disposed upon the inside of the cup, and the portion of the coupling means upon the container is peripherally complete.
5. A torch as claimed in claim 3, wherein the portion of the coupling means within the cup is peripherally complete and the slot is disposed upon the outside of the neck of the container.

6. A torch as claimed in claim 5, wherein the coupling means comprises internal threads upon the cup and external threads upon the neck of the container.

7. A torch as claimed in claim 1, wherein the coupling means comprises a bayonet type connection.

8. A torch as claimed in claim 7, wherein the connector includes a cup upon the section, the container includes a neck inserted within said cup, and the bayonet type connection includes external bayonet lugs upon the outer end of the neck and internal bayonet lugs within the cup.

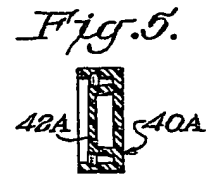
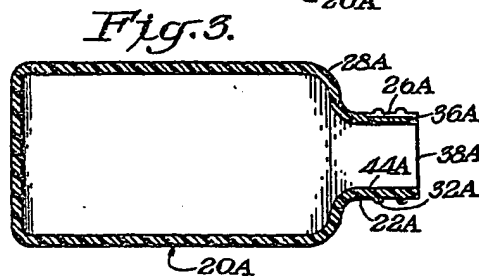
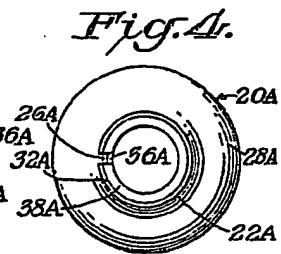
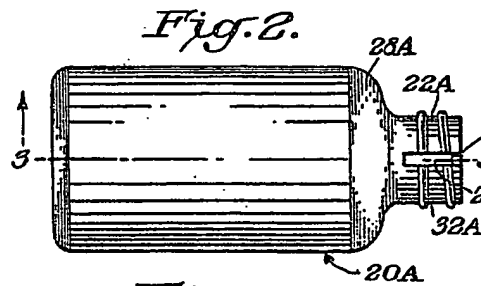
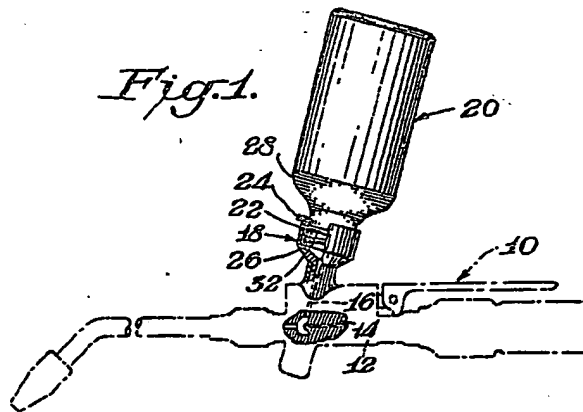
9. A torch as claimed in claim 8, wherein a ring is concentrically disposed upon the neck a short distance from the bayonet lugs for engaging the outer edge of the cup to maintain the container firmly supported upon it, and a slot extends through said ring for permitting air to pass through it.

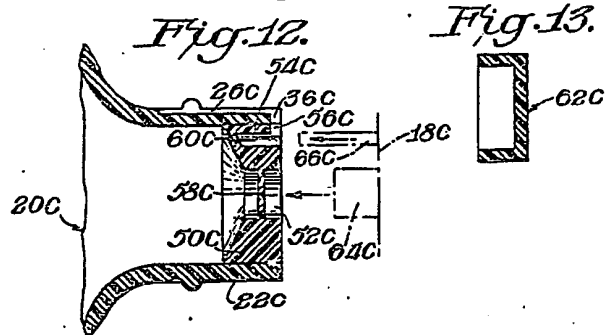
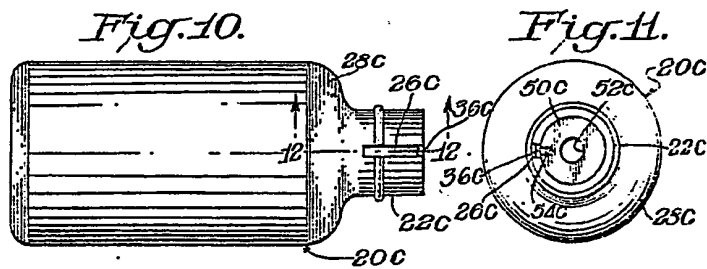
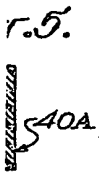
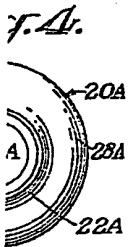
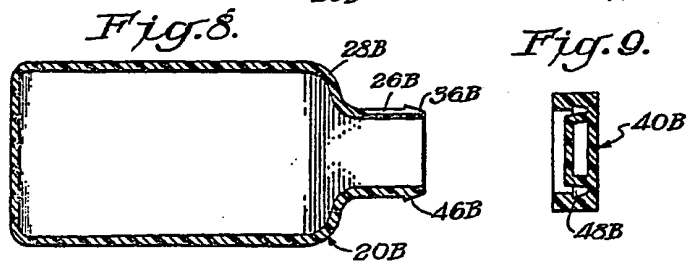
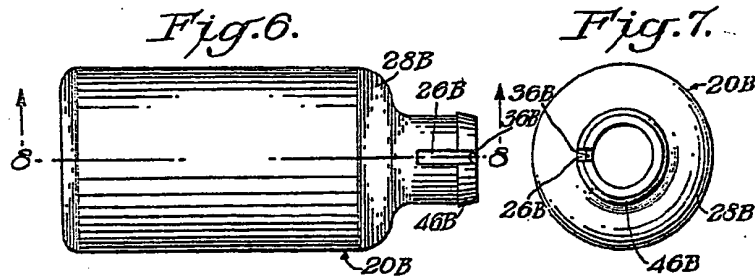
10. A torch as claimed in claim 7, wherein a slot is provided in the base of the cup for ensuring that some air passes between the abutting edge of the neck and the adjacent surface of the cup.

11. A flame spray torch having a powder injecting section substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

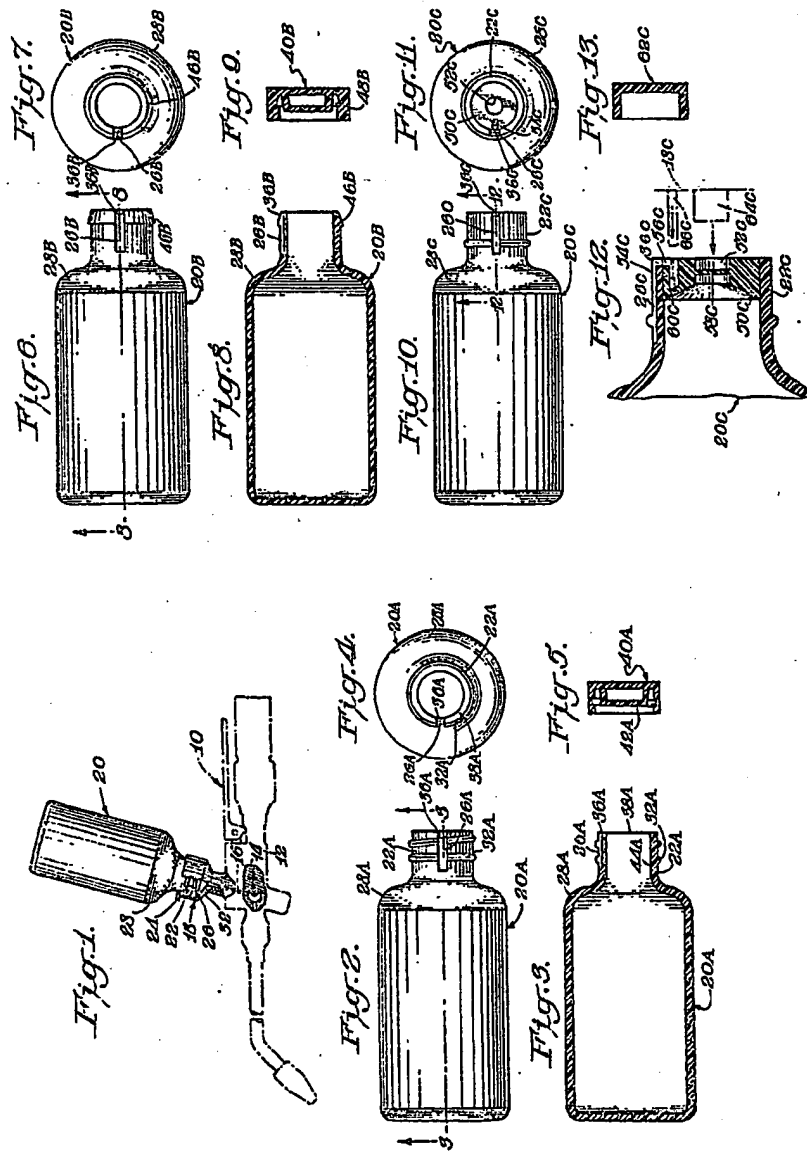
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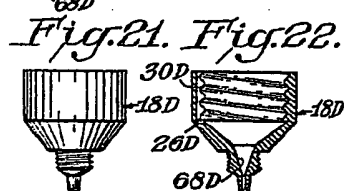
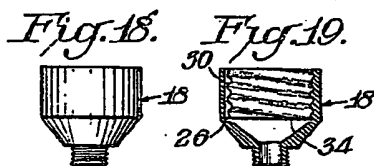
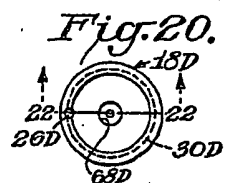
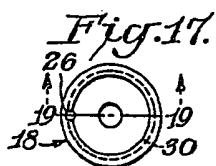
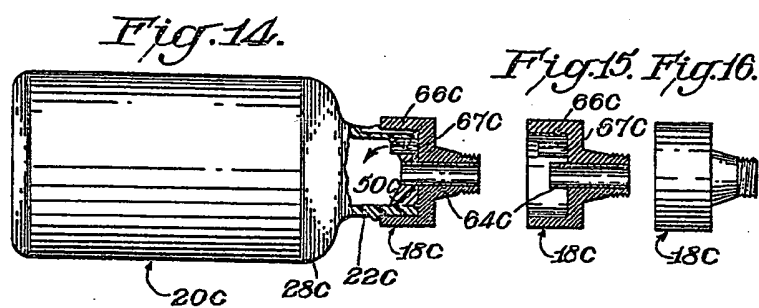




Fig. 16.

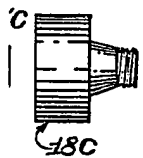


Fig. 24.

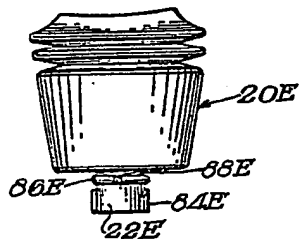


Fig. 25.

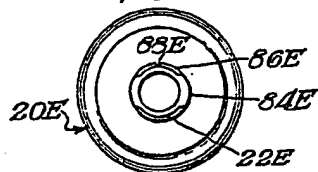


Fig. 22.

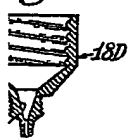


Fig. 23.

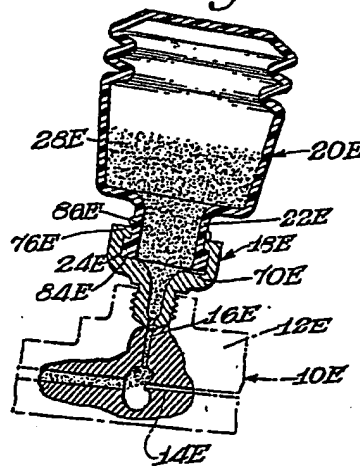


Fig. 26.

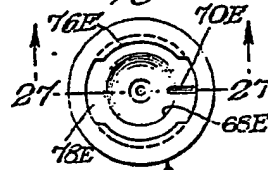


Fig. 27.

